WHAT IS CLAIMED IS:

1. A diffractive optical element that diffracts incident
light, comprising:

    a substrate with a first main surface and a second
main surface, a refractive index of the substrate being
equal to n where n is a value greater than one;

    a first diffractive optical element pattern that is
formed on part of the first main surface with a pattern
pitch Λ such that $\lambda/n < \Lambda \leq \lambda$, where λ is a wavelength
of the incident light; and

    a second diffractive optical element pattern that
is formed on one of the first main surface and the second
main surface at a predetermined position on an optical
path that diffracted light produced by the first
diffractive optical element pattern takes within the
substrate.

2. A diffractive optical element according to Claim 1,
wherein the first main surface is a main surface that is
first struck by the incident light.

3. A diffractive optical element according to Claim 1,
wherein the first main surface is an opposite main surface
to a main surface that is first struck by the incident
light.

1 4. A diffractive optical element according to Claim 1,

2 wherein the second diffractive optical element

3 pattern is formed on the second main surface and is

4 positioned so as to be incident to the diffracted light

5 produced by the first diffractive optical element pattern

6 after the diffracted light has been subjected to total

7 internal reflection within the substrate x times, where

8 x is equal to zero or an even number.

1 5. A diffractive optical element according to Claim 1,

2 wherein the second diffractive optical element

3 pattern is formed on the first main surface of the substrate

4 and is positioned so as to be incident to the diffracted

5 light produced by the first diffractive optical element

6 pattern after the diffracted light has been subjected to

7 total internal reflection within the substrate an odd

8 number of times.

1 6. A diffractive optical element according to Claim 1,

2 wherein the second diffractive optical element

3 pattern is positioned on an optical path taken by diffracted

4 light produced by the first diffractive optical element

5 pattern when the incident light with the wavelength λ is

6 perpendicular to the first diffractive optical element

7 pattern.

1 7. A diffractive optical element according to Claim 1,
2   wherein the diffracted light that is incident on the
3 second diffractive optical element pattern is positive
4 first-order diffracted light.

1 8. A diffractive optical element according to Claim 1,
2   wherein the diffracted light that is incident on the
3 second diffractive optical element pattern is negative
4 first-order diffracted light.

1 9. A diffractive optical element according to Claim 1,
2   wherein the first main surface of the substrate is
3 parallel to the second main surface.

1 10. A diffractive optical element according to Claim 1,
2   wherein a reflective film is provided on a different
3 main surface to the second diffractive optical element
4 pattern at a predetermined position, the reflective film
5 reflecting diffracted light produced by the second
6 diffractive optical element pattern so that the diffracted
7 light passes back through the substrate and then exits
8 the substrate.

1 11. A diffractive optical element according to Claim 1,
2   wherein a pattern pitch Λ' of the second diffractive
3 optical element pattern is set so that $\lambda/n < \Lambda' \leqq \lambda$, where

4   λ is a wavelength of the incident light.

1   12. A diffractive optical element according to Claim 11,
2   wherein the pattern pitch Λ' of the second diffractive
3   optical element pattern is equal to the pattern pitch Λ
4   of the first diffractive optical element pattern.

1   13. A diffractive optical element according to Claim 1,
2   wherein the second diffractive optical element
3   pattern is composed of slits, each slit having a slanted
4   part when viewed in a cross-section taken in a plane that
5   includes a main optical axis of the incident light and
6   a main optical axis of the diffracted light, the diffracted
7   light being incident on the slanted parts of the slits
8   in the second diffractive optical element pattern.

1   14. A diffractive optical element according to Claim 13,
2   wherein each slit in the second diffractive optical
3   element pattern is shaped as an approximately right-angled
4   triangle when viewed in a cross-section taken in the plane
5   that includes the main optical axis of the incident light
6   and the main optical axis of the diffracted light.

1   15. A diffractive optical element according to Claim 13,
2   wherein a diffraction angle for the diffracted light
3   is assumed to be θ when the incident light is perpendicular

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4   to the first diffractive optical element pattern, a

5   critical angle of the substrate is θ_t, and each slanted

6   part forms an angle θ_b with respect to a direction

7   perpendicular to incident light, the angle θ_b being set

8   so as to satisfy a condition $(\theta-\theta_b)<\theta_t$.

1   16. A diffractive optical element according to Claim 1,

2   wherein the second diffractive optical element

3   pattern is formed of a plurality of slits that are curved

4   in a plane that is parallel to the main surface on which

5   the second diffractive optical element pattern is formed.

1   17. An optical pickup that optically reads information

2   that has been recorded on an optical recording medium,

3   comprising:

4   laser beam exposing means which includes a light

5   source that emits a laser beam and focuses the laser beam

6   on an information recording surface of the optical

7   recording medium;

8   a first polarizing beam splitter for splitting light

9   reflected back off the information recording surface into

10 first polarized light and second polarized light that is

11 polarized in a different direction to the first polarized

12 light; and

13   photoelectric conversion means for receiving the

14 first polarized light and the second polarized light and

15 converting the first polarized light and the second
16 polarized light into electrical signals,

17   wherein the first polarizing beam splitter includes:
18   a first substrate with a first main surface and a
19 second main surface, a refractive index of the substrate
20 being equal to n where n is a value greater than one;
21   a first diffractive optical element pattern that is
22 formed on part of the first main surface with a pattern
23 pitch Λ such that $\lambda/n < \Lambda \leqq \lambda$, where λ is a wavelength
24 of the reflected light; and
25   a second diffractive optical element pattern that
26 is formed on one of the first main surface and the second
27 main surface at a predetermined position on an optical
28 path that diffracted light produced by the first
29 diffractive optical element pattern takes within the first
30 substrate.

1 18. An optical pickup according to Claim 17, further
2 comprising a second polarizing beam splitter, positioned
3 on an optical path between the light source and the
4 information recording surface, for transmitting the laser
5 beam emitted by the light source and redirecting the
6 reflected light toward the first polarizing beam splitter,
7   the second polarizing beam splitter including:
8   a second substrate with a first main surface and a
9 second main surface, a refractive index of the substrate

10   being equal to n' where n' is a value greater than one;

11   a third diffractive optical element pattern that is

12   formed on part of the first main surface of the second

13   substrate with a pattern pitch Λ' such that $\lambda/n' < \Lambda' \leqq$

14   λ; and

15   a fourth diffractive optical element pattern that

16   is formed on one of the first main surface and the second

17   main surface of the second substrate at a predetermined

18   position on an optical path that diffracted light produced

19   by the third diffractive optical element pattern takes

20   within the second substrate.

1   19. An optical pickup according to Claim 18,

2   wherein the first substrate and second substrate are

3   a single substrate, the first diffractive optical element

4   pattern is formed on one of the first main surface and

5   the second main surface at a position that is incident

6   to diffracted light produced by the fourth diffractive

7   optical element pattern.